



C390\_\_X550

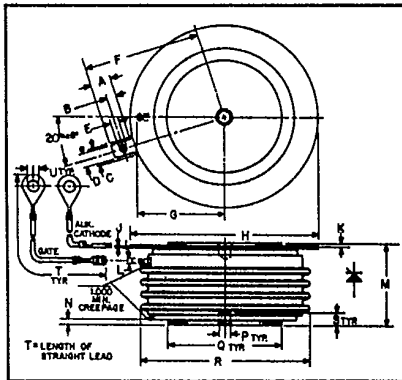
T-25-20

Powerex, Inc. Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72.75.15

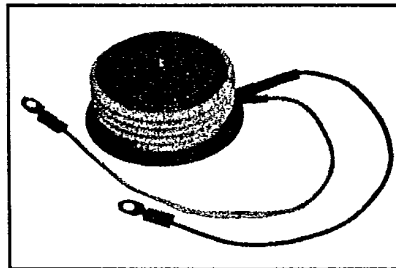
## Phase Control SCR

620 Amperes Avg  
100-400 Volts



C390\_\_X550  
Outline Drawing

Dimensions	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	.240	.260	6.096	6.604
B	.110	.130	2.794	3.302
C	.245	—	6.223	—
D	.186	.191	4.724	4.851
E	.060	.075	1.524	1.905
F	—	1.430	—	36.32
G	—	1.065	—	27.051
H	2.200	2.500	55.88	63.50
J	.011	.019	2.794	3.483
K	.030	.130	.762	3.302
L	.056	.060	1.422	1.524
M	1.000	1.065	25.40	27.05
N	.030	.096	.762	2.438
P	.130	.150	3.302	3.810
Q	1.300	1.345	33.02	34.16
R	—	2.150	—	54.61
S	.067	.803	1.702	2.110
T	12.200	12.360	309.9	313.9
U	.137	.153	3.480	3.886



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### Description

Powerex Silicon Controlled Rectifiers (SCR) are designed for phase control applications. These are all-diffused, Press-Pak (Pow-R-Disc) devices employing the field-proven amplifying (di/namic) gate.

### Features:

- ☐ Low On-State Voltage
- ☐ High di/dt
- ☐ High dv/dt
- ☐ Hermetic Packaging
- ☐ Excellent Surge and I<sup>2</sup>t Ratings
- ☐ High Temperature Operation

### Applications:

- ☐ Power Supplies
- ☐ Battery Chargers
- ☐ Motor Control
- ☐ Light Dimmers
- ☐ VAR Generators

### Ordering Information

Example: Select the complete nine digit part number you desire from the table – i.e. C390BX550 is a 200 Volt, 620 Ampere Phase Control SCR.

Type	Voltage		Current
	V <sub>ORM</sub> V <sub>RRM</sub>	Code	
C390__X550	100	A	620
	200	B	
	300	C	
	400	D	



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### Absolute Maximum Ratings

	Symbol	C390_X550	Units
RMS On-State Current	$I_{T(RMS)}$	975	Amperes
Average On-State Current	$I_{T(av)}$	620	Amperes
Peak One-Cycle Surge (Non Repetitive) On-State Current (60Hz)	$I_{TSM}$	9000	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz)	$I_{TSM}$	8200	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive)	$di/dt$	800	Amperes/ $\mu s$
Critical Rate-of-Rise of On-State Current (Repetitive)	$di/dt$	500	Amperes/ $\mu s$
$I^2t$ (for Fusing), One Cycle at 60Hz	$I^2t$	335,000	A <sup>2</sup> sec
Peak Gate Power Dissipation, 40 $\mu$ sec Pulse	$P_{GM}$	200	Watts
Average Gate Power Dissipation	$P_{G(av)}$	5	Watts
Storage Temperature	$T_{STG}$	-40 to 150	°C
Operating Temperature	$T_J$	-40 to 150	°C
Mounting Force <sup>①</sup>		1800 to 2200	lb.
Mounting Force <sup>①</sup>		8 to 9.8	kN

① Consult recommended mounting procedures.



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**Electrical and Thermal Characteristics**

Characteristics	Symbol	Test Conditions	C390_X550	Units
<b>Voltage—Blocking State Maximums</b>				
Forward Leakage, Peak	$I_{DRM}$	$T_J = 150^\circ\text{C}$ , $V = \text{rated } V_{DRM}$	50	mA
Reverse Leakage, Peak	$I_{RRM}$	$T_J = 150^\circ\text{C}$ , $V = \text{rated } V_{RRM}$	50	mA
<b>Current—Conducting State Maximums</b>				
Peak On-State Voltage	$V_{TM}$	$T_J = 25^\circ\text{C}$ , $I_T = 3000\text{A}$ , Duty Cycle $\leq 0.01\%$	1.9	Volts
<b>Switching</b>				
Typical Turn-Off Time	$t_q$	$T_J = 150^\circ\text{C}$ ; $I_{TM} = 500\text{A}$ ; $V_R = 50\text{V Min.}$ ; $V_{DRM}$ (Reapplied); Rate-of-Rise of Reapplied Off-State Voltage = $20\text{V}/\mu\text{sec}$ (linear); Commutation $di/dt = 25\text{A}/\mu\text{sec}$ ; Repetition Rate = 1 pps; Gate Bias During Turn-off Interval = 0 Volts, $100\Omega$	125	$\mu\text{sec}$
Typical Delay Time	$t_d$	$T_J = 25^\circ\text{C}$ ; $I_{TM} = 50\text{A}$ ; $V_{DRM}$ Rated. Gate Supply: 20 Volts, $20\Omega$ , $0.1\mu\text{sec}$ Max. Rise Time	1	$\mu\text{sec}$
Min. Critical $dv/dt$ exponential to $V_{DRM}$	$dv/dt$		200	$\text{V}/\mu\text{sec}$
<b>Thermal</b>				
Maximum Thermal Resistance, <sup>①</sup> double sided cooling				
Junction to Case	$R_{\theta JC}$		.06	$^\circ\text{C}/\text{Watt}$
Case to Sink, Lubricated	$R_{\theta CS}$		.02	$^\circ\text{C}/\text{Watt}$
<b>Gate—Maximum Parameters</b>				
Gate Current to Trigger	$I_{GT}$	$T_J = 25^\circ\text{C}$ , $V_D = 6\text{Vdc}$ , $R_L = 3\Omega$	200	mA
Gate Voltage to Trigger	$V_{GT}$	$T_J = -40^\circ\text{C}$ to $150^\circ\text{C}$ , $V_D = 6\text{Vdc}$ , $R_L = 3\Omega$	5	Volts
Non-Triggering Gate Voltage	$V_{GDM}$	$T_J = 150^\circ\text{C}$ , rated $V_{DRM}$ , $R_L = 1000\Omega$	.15	Volts
Peak Forward Gate Current	$I_{GTM}$		10	Amperes
Peak Reverse Gate Voltage	$V_{GRM}$		5	Volts

① Consult recommended mounting procedures.



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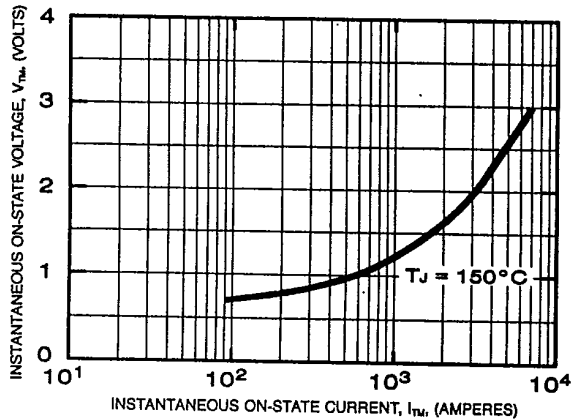
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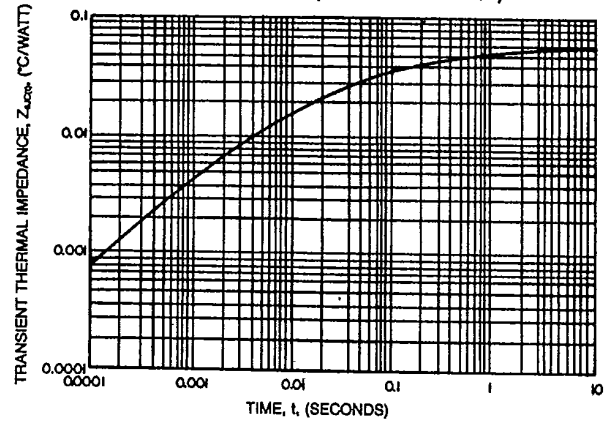
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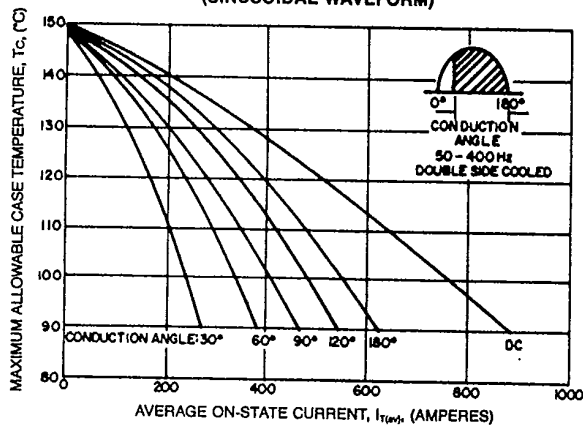
MAXIMUM ON-STATE CHARACTERISTICS



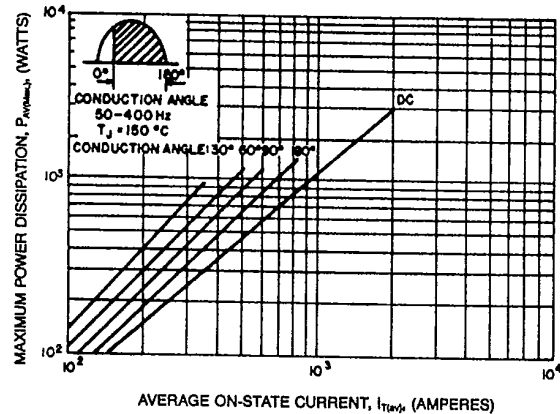
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



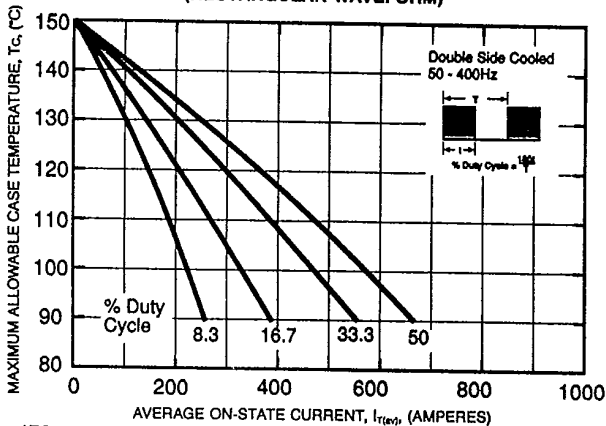
MAXIMUM ALLOWABLE CASE TEMPERATURE (SINUSOIDAL WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (SINUSOIDAL WAVEFORM)



MAXIMUM ALLOWABLE CASE TEMPERATURE (RECTANGULAR WAVEFORM)



MAXIMUM ON-STATE POWER DISSIPATION (RECTANGULAR WAVEFORM)

